Appendix B Meteorological Data

This section contains meteorological data derived from various regulatory and non-regulatory sites. The data provides a comparative analysis of winds speed, wind direction, wind gusts and concentration data. Please note that meteorological instruments measure at different heights, and at different time intervals. By taking, the actual time of measurement and assuring that all data represented is in Pacific Standard Time (PST) there is uniformity of the data. In addition, not all stations measure at the exact same time, i.e. measurements at 053 and 056 therefore, comparisons are measurements within a 60-minute period. While there may be some overlapping and slight differences the comparative analysis provides the reader with a better understanding of the regional effect of the Exceptional Event.

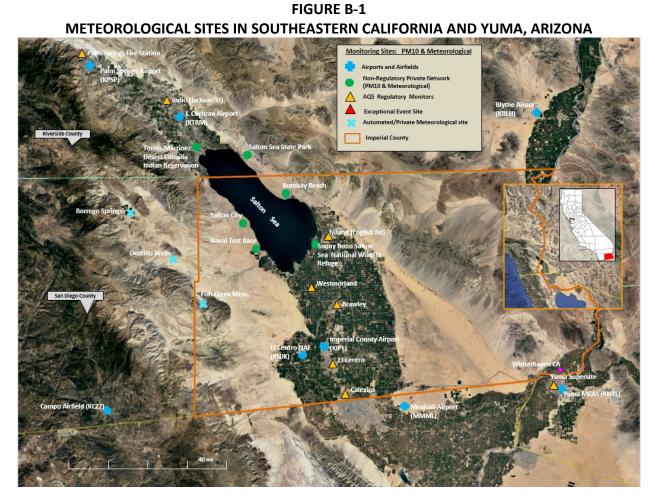


Fig B-1: This image shows the meteorological sites and the air quality monitoring sites used in this document. Google Earth base map. Inset locator map of California from Wikipedia

IMPERIAL COUNTY SITES FIGURES B-2 THROUGH B-13

FIGURE B-2 IMPERIAL COUNTY AIRPORT (KIPL) WIND SPEED, GUSTS AND DIRECTION

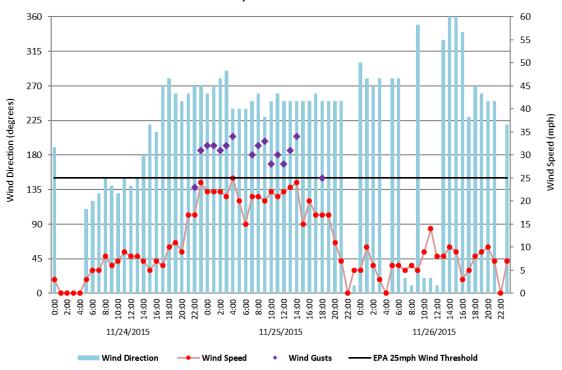
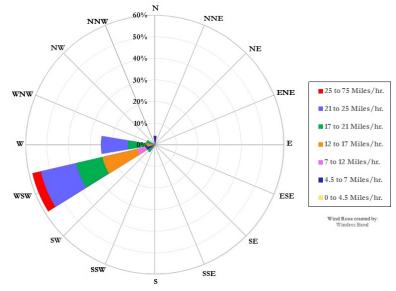
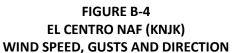


FIGURE B-3
IMPERIAL COUNTRY AIRPORT WIND ROSE - NOVEMBER 25, 2015



Figs B-2 & B-3: Imperial Airport meteorological data from the NCEI's QCLCD system



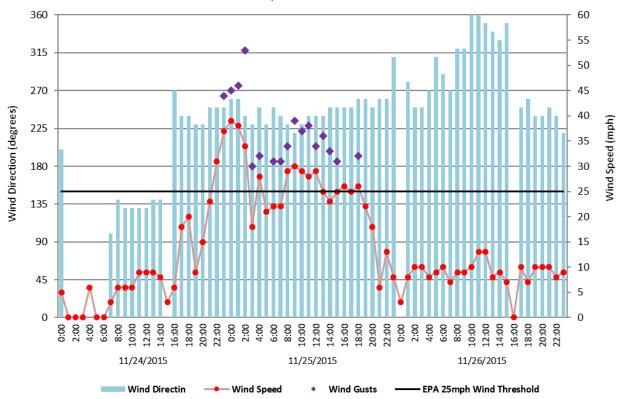
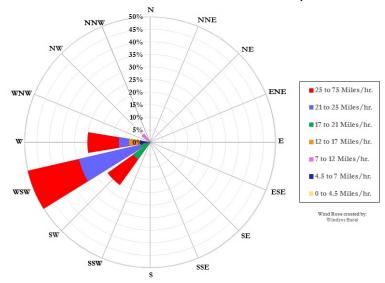
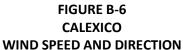


FIGURE B-5
EL CENTRO NAF WIND ROSE - NOVEMBER 25, 2015



Figs B-4 & B-5: El Centro NAF meteorological data from the NCEI's QCLCD system



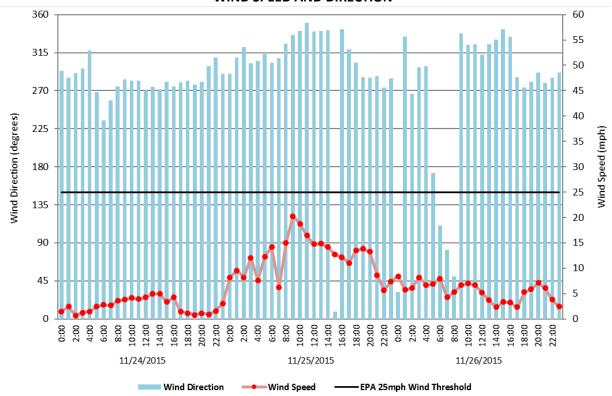
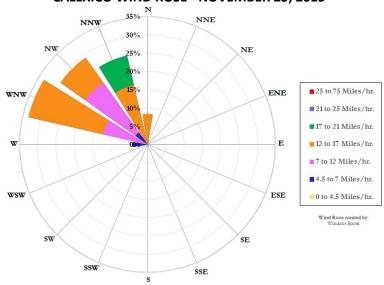
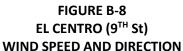


FIGURE B-7
CALEXICO WIND ROSE - NOVEMBER 25, 2015



Figs B-6 & B-7: Calexico meteorological data from the EPA's AQS data bank



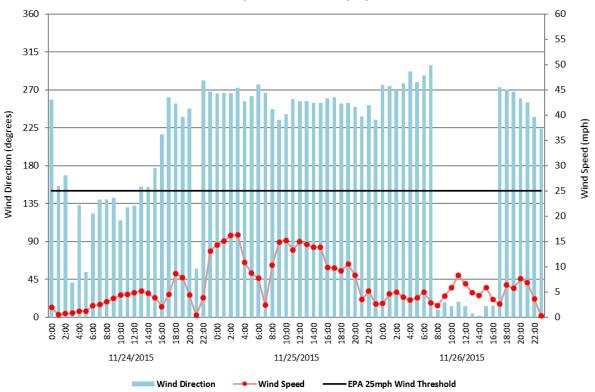
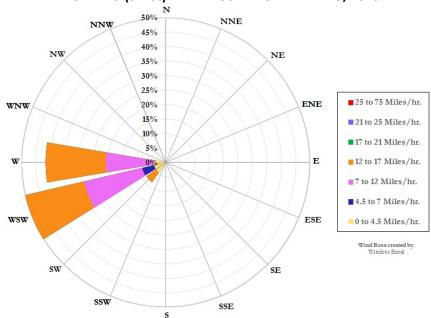
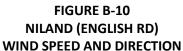


FIGURE B-9
EL CENTRO (9TH St) WIND ROSE - NOVEMBER 25, 2015



Figs B-8 & B-9: Calexico meteorological data from the EPA's AQS data bank



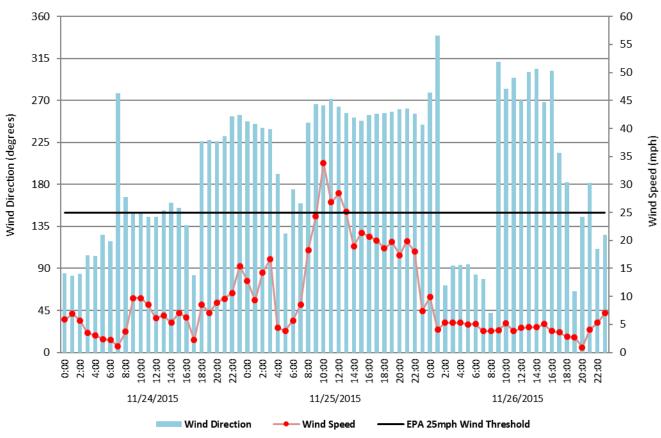
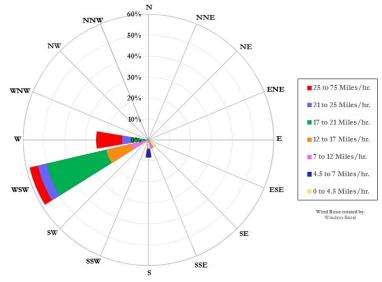


FIGURE B-11
NILAND (ENGLISH RD) WIND ROSE - NOVEMBER 25, 2015



Figs B-10 & B-11: Niland meteorological data from the EPA's AQS data bank

FIGURE B-12
WESTMORLAND
WIND SPEED AND DIRECTION

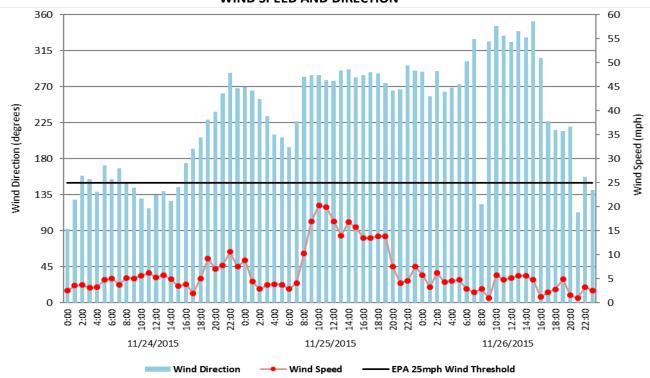
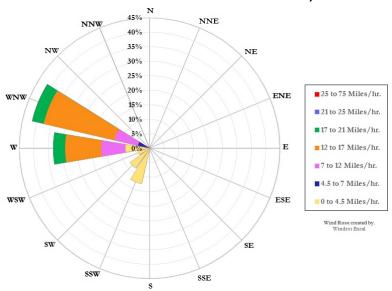


FIGURE B-13
WESTMORLAND WIND ROSE - NOVEMBER 25, 2015



Figs B-12 & B-13: Westmorland meteorological data from the EPA's AQS data bank

Wind Speed (mph)

11/26/2015

EPA 25mph Wind Threshold

EASTERN RIVERSIDE COUNTY SITES

FIGURE B-14 **BLYTHE AIRPORT (KBLH)** WIND SPEED, GUSTS AND DIRECTION 360 60 55 315 50 270 45 Wind Direction (degrees) 40 225 35 180 30 25 135 20 90 15

8:00 10:00 12:00

11/25/2015

Wind Gusts

2:00 4:00 6:00

Fig B-14: Blythe meteorological data from the NCEI's QCLCD system

11/24/2015

Wind Direction

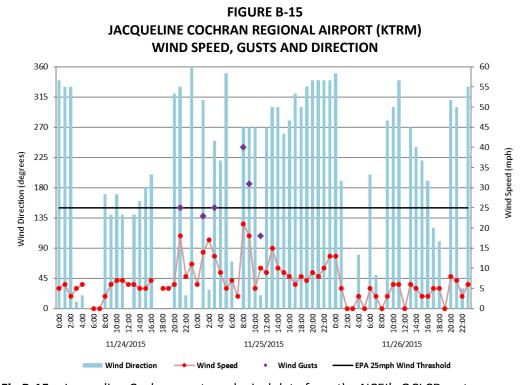


Fig B-15: Jacqueline Cochran meteorological data from the NCEI's QCLCD system

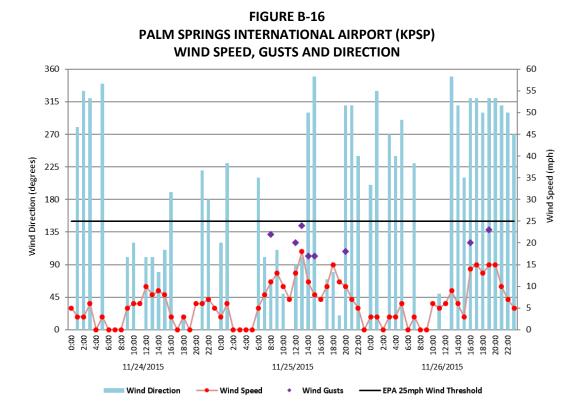


Fig B-16: Palm Springs Airport meteorological data from the NCEI's QCLCD system

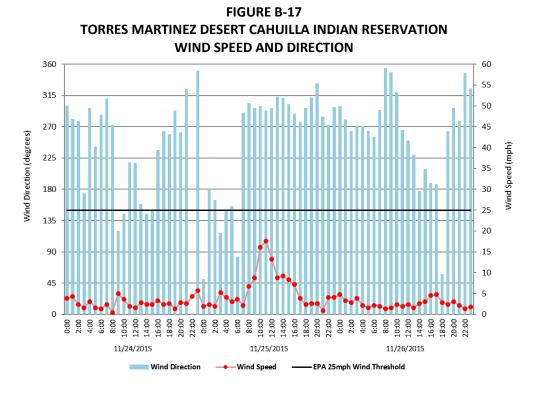


Fig B-17: Meteorological data from the EPA's AQS data bank

MEXICO

FIGURE B-18
MEXICALI INTERNATIONAL AIRPORT (MMML)
WIND SPEED AND DIRECTION

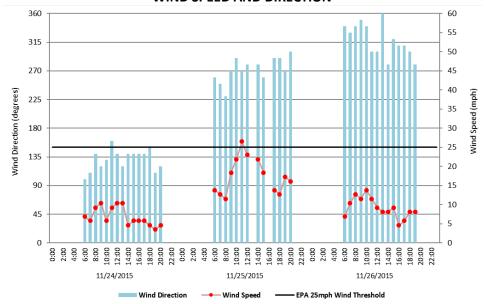


Fig B-18: Meteorological data from the University of Utah's MesoWest

SAN DIEGO COUNTY

FIGURE B-19 CAMPO AIRPORT (KCZZ) WIND SPEED, GUSTS AND DIRECTION

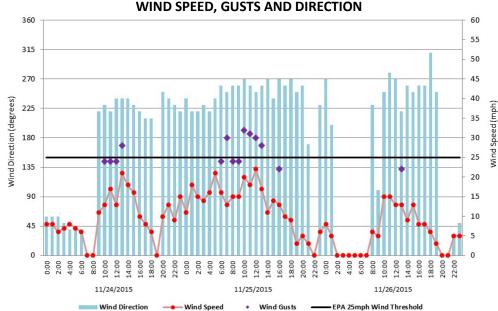


Fig B-19: Meteorological data from the NCEI's QCLCD system

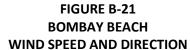
SOUTHWESTERN ARIZONA

FIGURE B-20 YUMA MCAS (KNYL) WIND SPEED, GUSTS AND DIRECTION 360 60 55 315 50 270 Wind Direction (degrees) 225 180 25 135 20 90 15 10 45 16:00 20:00 22:00 0:00 2:00 4:00 6:00 8:00 16:00 18:00 20:00 22:00 0:00 2:00 4:00 6:00 12:00 11/24/2015 11/25/2015 11/26/2015 EPA 25mph Wind Threshold

Fig B-20: Meteorological data from the NCEI's QCLCD system

UPSTREAM SITES

The following sites were upstream from Brawley and Niland during the wind event. High winds and/or gusts at these locations helped entrain and transport dust downstream.



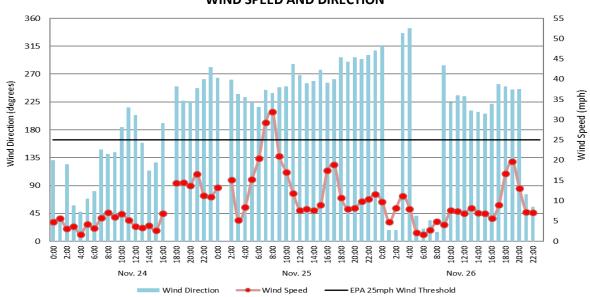
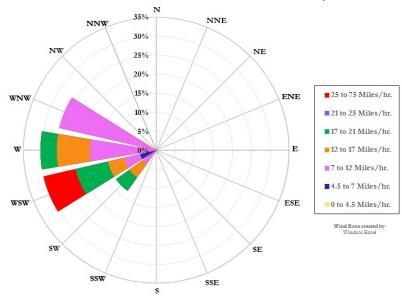
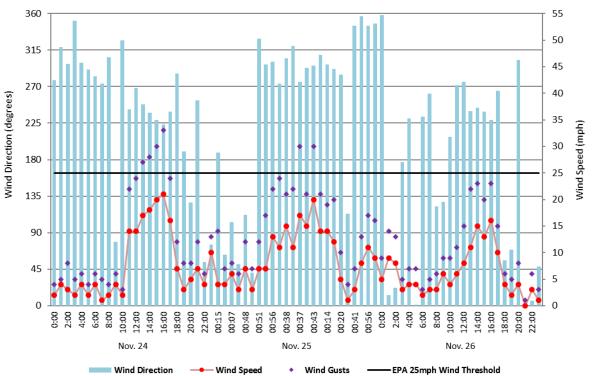


FIGURE B-22 BOMBAY BEACH WIND ROSE - NOVEMBER 25, 2015

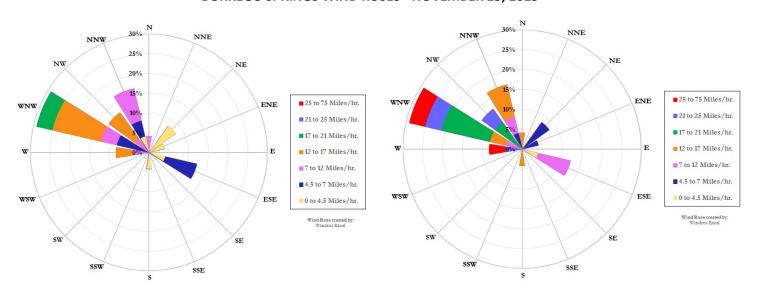


Figs B-21 & B-22: Meteorological data from the AQMIS2 system



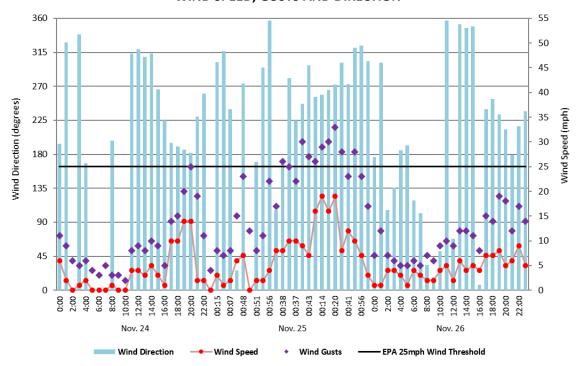


FIGURES B-24
BORREGO SPRINGS WIND ROSES - NOVEMBER 25, 2015

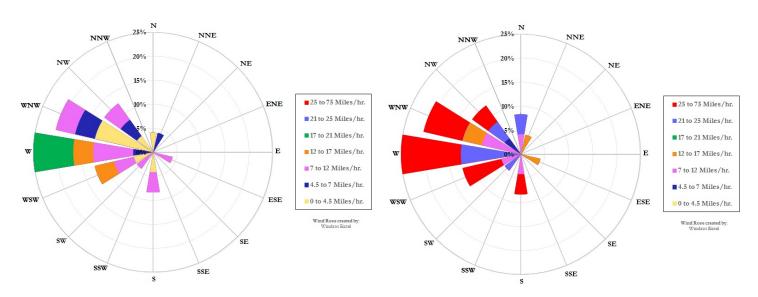


Figs B-23 & B-24: Meteorological data from the University of Utah's MesoWest. Station ID: BRGSD. Left wind rose is for winds. Right wind rose depicts gusts

FIGURE B-25 FISH CREEK MOUNTAINS WIND SPEED, GUSTS AND DIRECTION



FIGURES B-26
FISH CREEK MOUNTAINS WIND ROSES - NOVEMBER 25, 2015



Figs B-25 & B-26: Meteorological data from the University of Utah's MesoWest. Station ID: FHCC1. Left wind rose is for winds. Right wind rose depicts gusts

FIGURE B-27 (FORMER) NAVAL TEST BASE WIND SPEED AND DIRECTION

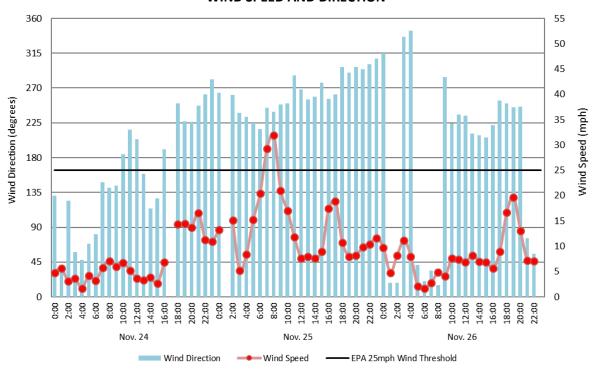
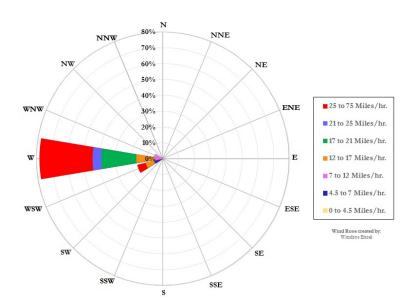


FIGURE B-38 (FORMER) NAVAL TEST BASE WIND ROSE - NOVEMBER 25, 2015



Figs B-27 & B-38: Meteorological data from the AQMIS2 system

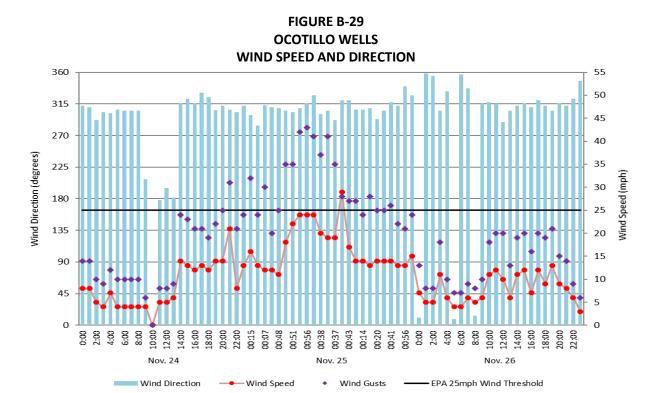
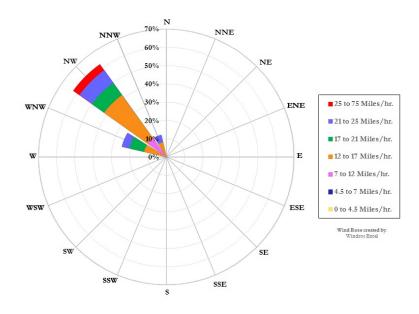


FIGURE B-30
OCOTILLO WELLS WIND ROSE - NOVEMBER 25, 2015



Figs B-29 & B-30: Meteorological data from the University of Utah's MesoWest system. Station ID: AS398/KD6RSQ5

FIGURE B-31 IMPERIAL COUNTY AIRPORT (KIPL) QCLCD

U.S. Department of Commerce National Oceanic & Atmospheric Administration

QUALITY CONTROLLED LOCAL CLIMATOLOGICAL DATA (final) HOURLY OBSERVATIONS TABLE IMPERIAL COUNTY AIRPORT (03144) IMPERIAL, CA

(11/2015)

National Climatic Data Center Federal Building 151 Patton Avenue Asheville, North Carolina 28801

Elevation: -58 ft. below sea level

Latitude: 32.834 Longitude: -115.578 Data Version: VER2

Date	Time (LST)	Station Type	Sky Conditions	Visibility (SM)	Weather Type	Į.	Dry Bulb Temp		Wet Bulb Temp		oint emp	Rel Humd %	Wind Speed (MPH)	Wind Dir	Wind Gusts (MPH)	Station Pressure (in. hg)	Press Tend	Net 3-hr Chg (mb)	Sea Level Pressure (in. hg)	Report Type	Precip. Total (in)	Alti- meter (in. hg)
1	2	3	4	5	6	7	8	9	10	(F)	12	13	14	15	16	17	18	19	20	21	22	23
24 24 24 24 24 24 24 24 24 24 24 24 24 2	0053 0153 0253 0353 0453 0553 0653 0753 0853 1053 1153 1253 1253 1353 1453 1753 1853 1753 1853 1953 2053 2253 2253	12 112 112 112 112 112 112 112 112 112	스R C C C C C C C C C C C C C C C C C C C	10.00 10.00		49 48 50 55 63 71 72 75 77 78 80 74 71 70 69 67 67 65	12.8 17.2 21.7 22.2 23.9 25.0 25.6 26.7 24.4 23.3 21.7 21.1 20.6 19.4 19.4 18.3	43 42 40 40 40 41 45 53 55 56 57 59 60 60 59 54 55 55 54 55 55 54 55 55 55 55 56 57 57 57 57 57 57 57 57 57 57 57 57 57	13.9 15.1 15.3 15.6 15.0 12.1 12.5 12.2 11.5 10.5	30 30 32 33 34 38 38 39 44 43 47 37 40 40 39 34 41	-1.1 -1.7 -2.8 -1.1 -1.1 -1.1 -1.1 0.0 0.6 1.1 3.3 3.3 3.9 6.7 6.1 8.9 8.3 2.8 4.4 4.4 4.4 1.1 5.0	43 43 43 50 50 46 42 33 26 29 26 37 37 38 29 27 37 38 29 34 35 36 30 46 30 46 47 37 38 48 48 48 48 48 48 48 48 48 48 48 48 48	0 0 3 5 5 5 8 6 7 9 8 8 8 7 5 7 6 110 111 9 117		23 31	29.95 29.96 29.95 29.95 29.95 29.96 29.97 29.99 29.99 29.99 29.99 29.86 29.85 29.85 29.84 29.85 29.84 29.85 29.84 29.85 29.84 29.85 29.83			29.90 29.88 29.88 29.89 29.90 29.91 29.93 29.93 29.93 29.90 29.86 29.80 29.78 29.78 29.77 29.78 29.77 29.78	AA AA AA AA AA AA AA AA AA AA AA AA AA		29.89 29.90 29.89 29.89 29.89 29.90 29.91 29.93 29.93 29.93 29.93 29.96 29.78 29.78 29.78 29.78 29.78 29.77 29.77

Dynamically generated Thu Apr 21 18:57:01 EDT 2016 via http://www.ncdc.noaa.gov/qclcd/QCLCD

U.S. Department of Commerce National Oceanic & Atmospheric Administration QUALITY CONTROLLED LOCAL CLIMATOLOGICAL DATA (final) HOURLY OBSERVATIONS TABLE IMPERIAL COUNTY AIRPORT (03144) IMPERIAL, CA (11/2015) National Climatic Data Center Federal Building 151 Patton Avenue Asheville, North Carolina 28801

Elevation: -58 ft. below sea level

Latitude: 32.834 Longitude: -115.578 Data Version: VER2

Date	Time (LST)	Station Type	Sky Conditions	Visibility (SM)	Weather Type	F	Dry Bulb emp	E Te	Net Bulb emp	Po Te	ew oint mp	Rel Humd %	Wind Speed (MPH)	Wind Dir	Wind Gusts (MPH)	Station Pressure (in. hg)	Press Tend	Net 3-hr Chg (mb)	Sea Level Pressure (in. hg)	Report Type	Precip. Total (in)	Alti- meter (in. hg)
\perp	_			-		(F)		(F)		(F)		40	44	45	40	47	40	• /		04	00	- 00
1	2	3	4	5	6	7		9	_	11		13	14	15	16	17	18	19	20	21	22	23
25 25 25 25 25 25 25 25 25 25 25 25			CLR	10.00		64				43		47	22	260	32	29.81			29.75	AA		29.75
25			CLR	10.00		64			11.9							29.82			29.75	AA		29.76
25			CLR	10.00		64			11.7			47	22	280		29.82			29.76	AA		29.76
25			CLR	9.00		63			11.2			46	21			29.82			29.75	AA		29.76
25			CLR	10.00		63			11.2			46	25		34	29.80			29.74	AA		29.74
25			CLR	10.00		64			11.7					240		29.82			29.75	AA		29.76
25			CLR CLR	10.00		64 67			12.4 13.4					240		29.82 29.83			29.76 29.77	AA AA		29.76 29.77
25			BKN070	10.00	l V	68								250 260		29.83			29.77	AA		29.77
25			FEW013 FEW070	8.00		69	20.6	55	12.7	44	5.6	20				29.88			29.82	AA		29.82
25			CLR	10.00			21.1						22	250		29.88			29.82	AA		29.82
25			FEW025	10.00		71	21.7	53	11 5	34						29.86			29.80	AA		29.80
25			CLR	10.00			21.7					26				29.85			29.78	AA		29.79
25			CLR	10.00			21.1					27				29.84			29.78	AA		29.78
25			CLR	10.00						34		27	24			29.83			29.77	AA		29.77
25	1553	12	CLR	10.00		67				35	1.7	31		250		29.86			29.80	AA		29.80
25	1653	12	CLR	10.00		63	17.2	50	9.7	35	1.7	35	20	250		29.87			29.81	AA		29.81
25	1753		CLR	10.00		61	16.1			37				260		29.88			29.82	AA		29.82
25			CLR	10.00		61	16.1			37						29.91			29.85	AA		29.85
25			CLR	10.00		60					2.2			250		29.94			29.88	AA		29.88
25 25			CLR	10.00		58				35				250		29.95			29.88	AA		29.89
			CLR	10.00		55					2.2			250		29.95			29.89	AA		29.89
			CLR	10.00		54			7.6	36	2.2	51		000		29.97			29.91	AA		29.91
25	2353	12	CLR	10.00		52	11.1	45	7.2	37	2.8	57	5	010		29.97			29.91	AA		29.91

Dynamically generated Thu Apr 21 18:57:25 EDT 2016 via http://www.ncdc.noaa.gov/qclcd/OCLCD

FIGURE B-32 EL CENTRO NAF (KNJK) QCLCD

U.S. Department of Commerce National Oceanic & Atmospheric Administration QUALITY CONTROLLED LOCAL CLIMATOLOGICAL DATA (may be updated) HOURLY OBSERVATIONS TABLE NAF (23199) EL CENTRO, CA (11/2015) National Climatic Data Center Federal Building 151 Patton Avenue Asheville, North Carolina 28801

Elevation: -42 ft. below sea level

Latitude: 32.816 Longitude: -115.683 Data Version: VER2

Date	Time (LST)	Station Type	Sky Conditions	Visibility (SM)	Weather Type	В	Ory Bulb emp (C)	E	Vet Julb emp (C)	Po	ew oint mp (C)	Rel Humd %	Wind Speed (MPH)	Wind Dir	Wind Gusts (MPH)	Station Pressure (in. hg)	Press Tend	Net 3-hr Chg (mb)	Sea Level Pressure (in. hg)	Report Type	Precip. Total (in)	Alti- meter (in. hg)
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
24 24 24 24 24 24 24 24 24 24 24 24 24 2	0056 0156 0256 0356 0456 0556 0756 0856 0956 1056 1156 1256 1456 1656 1756 1856 2056 2156 2256 2356	.	CLR CLR CLR CLR CLR CLR CLR CLR FEW250 FEW250 FEW250 FEW200 SCT250 FEW200 SCT250 FEW200 SCT250 FEW200 SCT250 FEW200 SCT250 CLR BKN180 BKN250	10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 9.00 9		52 47 47 46 45 44 53 60 68 71 73 76 77 74 76 67 68 68 68 68 68 68	8.3 7.8 7.2 6.7 11.7 15.6 20.0 22.8 24.4 26.1 25.0 23.5 24.3 22.8 21.1 19.4 20.0 18.3	41 38 40 39 37 37 44 50 52 54 55 56 57 55 53 53 52 53	5.1 3.3 4.1 3.6 2.8 2.7 6.5 10.0 11.2 12.1 14.1 14.1 14.1 12.9 13.4 14.0 12.0 12.5 11.5	26 24 29 28 25 26 32 40 36 37 36 38 44 40 39 37 34 42	4.4 2.2 2.8 2.8 2.2 3.3 1.1 4.5 5.0 1.1 4.4 3.9 2.8 1.1 5.6	37 41 50 50 46 49 45 48 31 29 27 23 22 29 29 24 36 32 32 34 36 32 32 34 36 32 32 34 34 34 34 34 34 34 34 34 34 34 34 34	5 0 0 0 0 0 0 0 3 6 6 6 6 9 9 9 9 8 3 6 6 1 2 9 9 9 1 2 9 9 9 9 9 9 9 9 9 9 9 9 9	200 000 000 000 VR 000 100 130 130 130 140 140 270 240 240 230 230 250 250		29.96 29.96 29.95 29.95 29.95 29.96 29.97 29.99 30.00 29.99 29.99 29.98 29.85 29.85 29.84 29.85 29.84 29.84 29.85 29.84 29.85 29.84 29.85 29.84 29.85 29.84 29.85 29.84 29.85 29.84 29.85 29.86 29.86 29.86 29.87 29.87 29.88			29.96 29.95 29.95 29.95 29.97 29.98 29.99 29.99 29.99 29.99 29.89 29.85 29.85 29.85 29.85 29.85 29.85	AA AA AA AA AA AA AA AA AA AA AA AA AA		29.92 29.92 29.91 29.91 29.91 29.91 29.92 29.93 29.95 29.96 29.95 29.88 29.81 29.81 29.80 29.81 29.80 29.80 29.80 29.80 29.80

Dynamically generated Thu Apr 21 18:55:53 EDT 2016 via http://www.ncdc.noaa.gov/qclcd/QCLCD

U.S. Department of Commerce National Oceanic & Atmospheric Administration QUALITY CONTROLLED LOCAL CLIMATOLOGICAL DATA (may be updated) HOURLY OBSERVATIONS TABLE NAF (23199) EL CENTRO, CA (11/2015) National Climatic Data Center Federal Building 151 Patton Avenue Asheville, North Carolina 28801

Elevation: -42 ft. below sea level

Latitude: 32.816 Longitude: -115.683 Data Version: VER2

Date	Time (LST)	Station Type	Sky Conditions	Visibility (SM)	Weather Type	B Te (F)	Ory ulb emp (C)	В	Vet ulb emp (C)	P Te	ew oint emp (C)	Rel Humd %	Wind Speed (MPH)	Wind Dir	Wind Gusts (MPH)	Station Pressure (in. hg)	Press Tend		Sea Level Pressure (in. hg)	Report Type	Precip. Total (in)	Alti- meter (in. hg)
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
25 25 25 25 25 25 25 25 25 25 25 25 25 2	0050 0054 0056 00107 0114 0129 0256 0256 0456 0756 0756 0756 0756 1056 1156 1156 1156 1156 1156 1156 11		4 FEW006 FEW004 FEW004 FEW004 FEW004 FEW003 CLR FEW002 CLR CLR CLR CLR FEW070 FEW250 FEW070 SCT180 SCT250 FEW080 SCT180 BKN250 FEW080 SCT180 BKN250 FEW080 SCT180 SCT250 FEW080 SCT180 SKN250 FEW180 SCT250 FEW180 SCT250 FEW180 SCT250	5 2.50 1.75 1.75 1.75 1.75 1.75 1.75 1.75 1.75	6 HZ HZ HZ HZ HZ	64 64 64 64 64 64 64 63 63 62 63 66 68 68 70 70 70 70 69 66 63 62 63 65 65 65 66 66 66 66 66 66 66 66 66 66	18.0 17.8 17.8 17.8 17.8 17.8 17.8 17.2 16.7 17.2 20.0 20.0 20.0 21.1 21.1 21.1 21.1 16.7 17.2 16.7	53 53 53 53 53 53 53 53 53 52 52 53 54 56 55 55	11.7 11.7 11.7 11.7 11.7 11.5 11.5 11.5	7 43 7 43 7 43 7 43 7 43 7 43 7 43 6 42 9 42 9 42 9 42 1 33 1 33 3 33 3 36 3 34 3 34 3 34 3 34 3 34 3	6.0 5.6 6.1 6.1 5.6 5.6 5.6 6.7 7.2 8.3 6.1 5.0 0.6 0.6 0.6 0.6 0.6 0.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1	47 47 47 47 47 47 45 45 45 45 45 45 45 46 52 55 1 41 38 31 25 26 22 29 33 38 39 39 41	39 37 37 38 34 34 34 34 18 22 22 29 29 29 28 29 29 28 29 25 25 26 25 26 22 21 26	260 260 260 260 260 250 250 240 230 250 240 230 240 240 250 240 250 220 240 250 240 250 260 260 250 260 250 250 250 250 250 250 250 250 250 25	31 34 45 445 445 444 444 444 53 344 33 33 33 33 33 33 33 33 33 33 33 3	29.83 29.83 29.83 29.82 29.82 29.83 29.83 29.83 29.84 29.84 29.84 29.84 29.85 20.85 20.85 20.85	18	19	29.83 M M M 29.84 M M 29.85 29.83 29.83 29.83 29.83 29.83 29.83 29.87 29.87 29.87 29.87 29.87 29.89 29.87 29.89 29.87 29.89 29.87 29.89 29	SP SP ASP SSP AAA AAA AAA AAA AAA AAA AA	22	23 29.79 29.79 29.79 29.78 29.78 29.79 29.80 29.77 29.80 29.77 29.80 29.78 29.78 29.85 29.85 29.85 29.81 29.81 29.81 29.81 29.81 29.83 29.84 29.85 29.85 29.85 29.89 29.99 29.
25 25	2256 2356	5 5	FEW180 FEW250 CLR	10.00 10.00				47 44			2.2 1.7		13 8	260 310		29.96 29.96			29.96 29.97	AA AA		29.92 29.92

Dynamically generated Thu Apr 21 18:55:23 EDT 2016 via http://www.ncdc.noaa.gov/qclcd/OCLCD